
NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

NASA-16536 (June 2004)
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SECTION 16536

EXIT LIGHTING
06/04

NOTE: Delete, revise, or add to the text in this
section to cover project requirements. Notes are
for designer information and will not appear in the
final project specification.

This section covers exit lighting fixtures and lamps.

Drawings should show a three-dimensional detail of
each fixture with letter designation keyed to the
drawings and electrical symbols describing the type,
style, class, kind, and size of fixture.

PART 1 GENERAL

1.1 REFERENCES

NOTE: The following references should not be
manually edited except to add new references.
References not used in the text will automatically
be deleted from this section of the project
specification.

The publications listed below form a part of this section to the extent
referenced:

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101 (2003) Life Safety Code (National Fire
Codes, Vol 5)

U.S. DEPARTMENT OF ENERGY (DOE)

DOE LT-4 (2000) How to Buy Energy-Efficient Exit
Signs

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910 (2001) Occupational Safety and Health
Standards

UNDERWRITERS LABORATORIES (UL)

UL 924

(1995; 8th Ed; Rev thru July 2001) UL
Standard for Safety Emergency Lighting and
Power Equipment

1.2 GENERAL REQUIREMENTS

NOTE: If Section 16003 GENERAL ELECTRICAL
PROVISIONS is not included in the project
specification, applicable requirements therefrom
should be inserted and the following paragraph
deleted.

Section 16003 GENERAL ELECTRICAL PROVISIONS applies to work specified in
this section.

Material, Equipment, and Fixture Lists shall be submitted for the following
showing manufacturer's style or catalog numbers, specification and drawing
reference numbers, warranty information, and fabrication site.

1.3 SUBMITTALS

NOTE: Review submittal description (SD) definitions
in Section 01330 SUBMITTAL PROCEDURES and edit the
following list to reflect only the submittals
required for the project. Submittals should be kept
to the minimum required for adequate quality
control. Include a columnar list of appropriate
products and tests beneath each submittal
description.

The following shall be submitted in accordance with Section 01330 SUBMITTAL
PROCEDURES in sufficient detail to show full compliance with the
specification:

SD-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists shall be submitted for the
following in accordance with paragraph entitled, "General
Requirements," of this section.

Exit Lighting Units
Contemporary Fixtures
Accessories

SD-02 Shop Drawings

Installation drawings shall be submitted for Exit Lighting Units
in accordance with the paragraph entitled, "Installation," of this
section.

Outline drawings shall be submitted for Exit Lighting Units
indicating overall physical features, dimensions, ratings, service
requirements, and weights of equipment.

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items:

Exit Lighting Units
Contemporary Fixtures
Accessories

SD-06 Test Reports

Test reports shall be submitted showing results of Operational Tests of exit lighting systems.

SD-07 Certificates

Certificates shall be submitted showing compliance with the following requirements.

Efficiencies

PART 2 PRODUCTS

2.1 PRODUCT STANDARDS

Emergency exit lighting fixtures shall conform to UL 924, NFPA 101, and as specified.

Exit lighting fixtures shall be furnished completely assembled with wiring and mounting devices and ready for installation at the locations indicated. Ceiling-mounted fixtures shall be designed to be supported independent of the ceiling. Fixtures shall be equipped with lamps.

2.1.1 Efficiencies

Exit lighting fixtures shall have efficiencies in accordance with the recommended levels specified in DOE LT-4.

2.2 CONTEMPORARY FIXTURES

Contemporary exit lighting fixture shall have a fixture body with edge-lighted plastic exit-sign panels, face trims, lamps, lampholders, and mounting brackets for top, back, and end mounting to walls and ceilings in accordance with NFPA 101, as indicated.

Fixtures shall be [single] [double] face with thin wedge-shaped vertical cross sections. Top edge of double-face fixtures shall be not more than [2-3/4] [_____] -inches [70] [_____] millimeter thick. Top edge of single-face fixtures shall be not more than [2] [_____] -inches [50] [_____] millimeter thick. Bottom edge of double-face fixtures shall be not more than [1-3/4] [_____] -inches [45] [_____] millimeter thick. Bottom edge of single-face fixtures shall be not more than [1-1/4] [_____] -inches [32] [_____] millimeter thick.

Plastic sign panels shall be acrylic with [green] [_____] translucent letters and directional arrows, as required. Letters shall be [6] [_____] -inches [150] [_____] millimeter high with stroke not less than [3/4] [_____] inch [30] [_____] millimeter wide.

Wireway cover and plastic sign backup plate shall be [anodized sheet aluminum with a matte finish] [____]. Face trims shall be formed from [sheet aluminum and shall have a brushed-satin finish] [____]. [Fixture bodies formed from sheet steel shall be not less than [20] [____] gage [1] [____] millimeter and painted.]

Plastic sign panels shall be edge-lighted from the top with at least two low-voltage miniature incandescent lamps that will illuminate the plastic sign panels and floor. Exit signs shall be wired for two-circuit service at [120] [277] volts and shall include a diode circuit that will provide a minimum of [50,000] [____] hours of lamp life.

Mounting plates and brackets formed from sheet aluminum or plate shall have a brushed-satin finish. Mounting plates shall be not less than [4-1/2] [____] inches [115] [____] millimeter square and designed to secure the fixture to a [4] [____] inch [100] [____] millimeter square outlet box.

2.3 EMERGENCY POWER LOSS EXIT LIGHTING UNITS

Each self-contained unit shall have an automatic power failure device, test switch, pilot light, and fully automatic high/low solid-state trickle charger in a self-contained power pack. Battery shall be the [sealed-wet] [gelled-electrolyte] type and shall be maintenance-free for a period of not less than [10] [____]-years under normal operating conditions. Normal operation shall be with [120] [277]-volts. [Emergency lighting panel shall be used.]

2.4 LIGHT EMITTING DIODES (LEDs) EXIT LIGHTING FIXTURES

Exit lighting fixtures shall include sheetmetal enclosures with frames, battery charger, batteries, [green] [red] light emitting diodes (LEDs) and mounting brackets. Fixtures shall be [single] [double] faced. Mounting plates shall be suitable for securing the fixture to a 4 inch 100 millimeter outlet box. Fixture features shall include continuous charging, automatic switching to standby batteries upon loss of power, overload protection, short circuit protection, test switch, low voltage disconnect, switch controlled left and right LED directional arrows, and shall be field connectable to operate from [115] [277] volts. Minimum operating time of the battery system shall be three (3) hours for double faced fixtures and seven (7) hours for single faced fixtures. Brightness shall not be less than ten (10) candlepower candela. All components shall have a five year warranty.

2.5 SELF LUMINOUS EXIT SIGNS

All units shall be internally illuminated non-electric (light source is independent of electrical power and is generated by the action of tritium gas on a phosphorescent material).

All self luminous signs shall be in accordance with UL 924, 29 CFR 1910, Section 37, Part (G), Subparts (6) and (7), and NFPA 101, Section 5-10.3.3. All signs shall be licensed by the United States Nuclear Regulatory Commission. Integrity and performance shall be guaranteed for 20 years of normal use.

2.5.1 Enclosure

The assembled tamperproof enclosure shall be of [1/8 inch 3 millimeter high

impact ABS plastic] [0.20 inch 0.5 millimeter thickness metal], framed with 0.50 inch 1.3 millimeter thick extruded aluminum.

Each sign shall bear a permanently attached [metal] [plastic] nameplate bearing the Manufacturer's Name and Address and Date of Manufacture (in addition to information required by listed authorities).

2.5.2 Face

Each face of the sign shall be a non-colored translucent panel covered by an opaque 1/8 inch 3 millimeter red ABS plastic stencil bearing the word "EXIT" in 6 by 3/4 inch 150 by 20 millimeter letters and including a universal directional arrow which indicates the direction of the exit (left, right or both ways).

2.5.3 Illumination

Illumination of the sign shall be by means of sealed glass tubes, internally phosphor coated and filled with tritium gas. Tubes shall be securely bonded to the enclosure and cushioned against mechanical shock. Luminous areas shall have a minimum initial brightness of 0.15 footlamberts 0.51 candela per square meter and a guaranteed minimum brightness after ten years of 0.080 footlamberts 0.27 candela per square meter.

2.5.4 Mounting Accessories

Each sign shall be supplied with tamperproof hardware for wall mounting. Edge on for double face, flat for single face or double face for ceiling mount.

PART 3 EXECUTION

3.1 INSTALLATION

Fixtures shall be connected to the main panel bus through overcurrent protection. Emergency lighting panel shall be used where available.

3.2 FIELD TESTING

Exit lighting shall be demonstrated to operate satisfactorily in the presence of the Contracting Officer.

Operational Tests shall be performed in accordance with referenced standards in this section.

-- End of Section --